new matter and of the theories based upon it by Drs. Epping and Strassmaier convinced him of the general correctness of the results of his own investigations, at which he had arrived by a method peculiarly his own, and by many new readings of the cuneiform names of planets and stars which he was enabled to explain satisfactorily he confirmed several identifications of stars which had been pointed out by Dr. Epping by the light of mathematical astronomy. It is but fair to say that at the outset some differences of opinion existed between these distinguished scholars, but already many of them have been adjusted, and the proof of the general accuracy of the work is therefore much stronger.

Prof. Jensen divides his book into two sections. In the first he treats of the "Universe and its Parts," and in the second of the "Creation and of the Formation of the World." Under the first heading, in a series of chapters, he discusses the sky and the heavenly bodies in it, special attention being paid to the consideration of the Zodiac, the earth, the Mountain of sunrise, the abodes the blessed dead and of the damned, and of the Okeanos; and under the second he translates and explains the Babylonian texts referring to the Creation and to the Deluge. Many of Prof. Jensen's ideas are new, and will therefore fail to be accepted by those who prefer to follow traditions and their own views in preference to results obtained directly from the cuneiform texts which are, after all, our only trustworthy authority on Babylonian cosmology. He argues his propositions in a sober manner, and he arranges his facts with clearness; he gives proof or authority for every statement, and he assumes or takes for granted little or nothing. Prof. Jensen's book is a careful statement of all the important views of the Babylonians concerning the system of the heavens and the earth as recorded by the official astronomers and astrologers attached to the library of Assurbanipal at Nineveh about B.C. 660. His work will command the respect and earn the gratitude of all true scholars, even of those who may disagree with him, and by reason of it the scientific astronomer of to-day with his telescope and spectroscope and instruments for stellar photography will respect his predecessors on the plains of Mesopotamia, who differ from him in their calculation of the length of the average period between new-moon and new-moon by two-fifths of a second only!

## OUR BOOK SHELF.

*Elements of Physiography.* By Hugh Dickie, LL.D. Collins Science Series. (London: Collins.)

THIS is a small manual designedly written as a text-book for the elementary stage of physiography, according to the syllabus of the Science and Art Department. All that is necessary for this stage is treated of within its pages in as concise and brief a manner as possible.

Interspersed amongst the text are upwards of 100 excellent illustrations and four coloured maps, and very good sets of questions for exercise are inserted at the end of each chapter

The author would do well to be a little more precise and accurate in some of his statements. In Article 150, p. 138, he says: "The position of a star in the sky is fixed as follows:—(1) Its angular distance E. or W. of the line passing through the poles." Which particular one of the infinite number of lines passing through the poles is meant is not very clear. He should have "fixed" the line by adding "and the zenith." At the end of Article 154 he states that "comets and nebulæ are bodies less dense in their composition than stars, and more erratic in their movements." Surely the author should know that nebulæ do not appear to wander about amongst the stars, but keep the same relative position with respect to the latter.

Upon the whole, however, the book, which is moderate in price, can be recommended to pupils preparing for the examination in elementary physiography.

*Seventh Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution*, 1885-86. By J. W. Powell, Director. (Washington: Government Printing Office.)

THE Report which occupies the first part of this handsome volume is too old to be read with much interest. Happily it is accompanied by papers which are of more than passing value. One of these—on Indian linguistic families of America north of Mexico—is by Prof. J. W. Powell, who, in the course of an elaborate discussion and exposition, throws much light on an intricate and most difficult subject. A paper by Mr. W. J. Hoffman on the Mide'wiwin or "grand medicine society" of the Ojibwa, will be read with pleasure by students of anthropology; and Mr. James Mooney devotes a very careful and interesting paper to the consideration of the sacred formulas of the Cherokees.

## LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

### A Remarkable Rainfall.

I SEND a few particulars of the recent remarkable rainfall at Crohamhurst, situated on the western slope of Mont Blanc, a peak on a spur of the D'Aguilar Range, an offset from the Blackall Ranges, South Eastern Queensland. The whole of this district is watered by the Stanley River, a tributary of the Brisbane River, and hence the values given below were prominent factors in producing the terrible floods from which we have suffered. I may mention that the observer at Crohamhurst is Mr. Inigo Owen Jones, one of my specially trained assistants, and that implicit reliance can be placed on his figures.

The following are the more remarkable falls of the flood period at Crohamhurst:—For 24 hours ending 9 a.m. February 1, 10·775 inches; ditto February 2, 20·056 inches; ditto February 3, **35**·714 inches; ditto February 4, 10·760 inches. The gauge is a standard of the "eight-inch" pattern, standing one foot above the ground at an altitude of about 1400 feet above mean sea level. The approximate latitude and longitude of Crohamhurst are 26° 50′ S. 152° 55′ E. The gauge was emptied every three hours, night and day, on the occasion of the greatest fall. I think meteorologists will agree that for a 24 hours' fall we have beaten the world's record.

CLEMENT L. WRAGGE,
Government Meteorologist of Queensland
(late of Ben Nevis).

Brisbane, March 22.

### The Cold Wave at Hongkong, January 1893.—Its After Effects.

NOW that the cold wave has completely passed away and warm weather is setting in (March 17, 1893), one can write more certainly respecting the effects upon animal and vegetable life.

With regard to the plants the effect has been disastrous, especially on the higher levels, and were it not that our rarest plants descend the hillsides, and often occur in sheltered nooks, this year's frost would have caused the extinction of several of them. Combined with the dry weather we have been enduring the frost has turned our fairly green island into a brown, desert-looking land, much of the undergrowth being dead. Most of the leaves have fallen, even new leaves that were unfolding have been shed, and only now is a fresh crop coming on. The common *Lantana Camara*, instead of being a blaze of bloom, is a ragged, almost leafless shrub, with here and there a flower-head; *Mimosa pudica* is in many cases killed outright, but some are putting out fresh leaves from the root stocks. *Rhodomyrtus tomentosa*, perhaps our commonest shrub, is quite killed on the hills, and the exquisite *Enkyanthus quinqueflorus*, with its pink bells and opal glands, that is so cherished by the Chinese at their New Year Festival (February 17) was hardly up to date. On February 28, with a party of naval officers, I ascended Lanto (3000 feet), a peak on an island near Hongkong, that is famous for Tiu Chung-fa, to give it the native name, and though I found numbers of the shrubs putting forth new red terminal leaves, only one was in flower, and the supply has been very scanty. Cocoa-nuts and bananas have suffered greatly.

At Canton Dr. Henry reports the banana plantations are ruined, and bamboos have suffered. "*Aleurites triloba* (the candle-nut) looks shrivelled up, while begonias, euphorbias, crotons, and scores of others look shrivelled up." There the plants suffered more than at Hongkong, for Mr. C. Ford, superintendent of the Botanic Gardens, reports Aleurites uninjured below an altitude of 300 feet. In his Government report he gives a list of over eighty species of exotics that have suffered, and the following effects upon indigenous plants:—

| | |
|---|---|
| *Bischoffia javanica*, Blume ... ... | Killed. |
| *Blechnum orientale*, Linn. ... ... | ,, |
| *Embelia Ribes*, Burm. ... ... | Leaves killed. |
| *ovata*, Scheff. ... ... ... | ,, ,, |
| *Evodia triphylla*, A. de C. ... ... | ,, ,, |
| *Ficus retusa*, Linn. ... ... ... | Killed. |
| *hispida*, Linn. ... ... ... | ,, |
| *Harlandi*, Benth. ... ... | ,, |
| *Garcinia oblongifolia*, Champ. ... | Leaves killed. |
| *Itea chinensis*, Hook. and Arn. ... | ,, ,, |
| *Melastoma candidum*, Don ... ... | Killed. |
| *Mœsa sinensis*, A. de C. ... ... | ,, |
| *Nephrolepis exaltata*, Schott ... ... | Fronds killed. |
| *biserrata*, Schott ... ... | ,, ,, |
| *Psychotria elliptica*, Ker ... ... | Leaves ,, |
| *Rottlera paniculata*, Juss. ... ... | , ,, |
| *Rhodomyrtus tomentosus*, Hassk ... | Killed. |
| *Sponia velutina*, Planch ... ... | ,, |
| *Tetracera sarmentosa*, Vahl ... ... | Leaves killed. |
| *Zanthoxylon nitidus*, A. de C. ... | ,, ,, |

"Those which were killed were above 800 feet above sea-level."

The effect upon insect life has been disastrous. A few straggling butterflies and hymenoptera lasted a few days, and then came a blank of weeks when not an insect of any kind was seen, and the place seemed painfully still from the absence of cicadas by day and crickets by night. My friend Mr. H. E. Denson found a glow-worm at the Peak on February 6, but saw nothing else in the way of insects.

Towards the end of February the weather began to be mild, though it is still below normal, and insects began to appear, some lepidoptera emerging crippled. Butterflies are still quite rare, and generally only single specimens seen. The only species as plentiful as usual is the little pale blue *Lycæna argea*. Last year butterflies absolutely swarmed. Thus Mr. J. J. Walker, R.N., has in his diary the following notes:—February 3. "Euplœas in greater numbers than I had ever seen." And again, March 4: "The profusion of butterflies was quite bewildering."

I cannot show the difference between the two seasons better than by comparing the list of species on the wing:—

| Species. | 1892 | 1893 | Remarks. |
|---|---|---|---|
| 1. *Danais genutia*, Cram. ... | c | — | — |
| 2. *similis*, Horsf. and Moore | c | — | In swarms, 1892. |
| 3. *grammica*, Butl. ... ... | v.c | — | In swarms, 1892. |
| 4. *tytia*, Gray ... .. | r | — | — |
| 5. *Euplœa superba*, Herbst. ... | v.c | r | One only, 1893. |
| 6. *lorquinii*, Feld. ... ... | v.c | — | Swarms in 1892. |
| 7. *Melanitis leda*, Linn. ... | v.c | r | One only, 1893. |
| 8. *Mycalesis mineus*, Linn. ... | c | — | — |
| 9. *Ypthima* ... ... ... | c | — | — |
| 10. *Clerome eumæus*, Drur. ... | v.c | — | — |
| 11. *Vanessa charonia*, Drur. ... | c | r | A few, 1893. |
| 12. *Junonia asterie*, Linn. ... | c | r | A few, 1893. |
| 13. *lemonias*, Linn.... ... | v.c | r | One only, 1893. |
| 14. *orithya*, Linn., var. *Andromeda* ... ... | c | — | — |
| 15. *Symbrenthia hypœlus*, Hub. | c | r | — |
| 16. *Ergolis ariadne*, Linn. ... | r | — | — |
| 17. *Neptis eurynome*, Westw. ... | v.c | r | — |
| 18. *Athyma perius*, Linn. ... | c | r | A few, 1893. |
| 19. *sulpitia*, Cram. ... | c | — | — |
| 20. *Hypolimnas misippus*, Linn. | r | — | — |
| 21. *Hestina assimilis*, Doub. ... | r | — | — |
| 22. *Cupha erymanthis*, Drur. ... | c | — | — |
| 23. *Argynnis niphe*, Linn. ... | r | r | One ♀, 1893. |
| 24. *Pyrameio cardui*, Linn. ... | r | — | — |
| 25. *indica*, Herbst. ... ... | r | r | One only, 1893. |
| 26. *Zemeros flegyas*, Cram.? ... | c | r | — |
| 27. *Abisara kausambi*, Feld. ... | c | r | — |
| 28. *Lampides œlianus*, Fabr. ... | v.c | c | As usual in March. |
| 29. *Polyommatus bœticus*, Linn.. | r | — | — |
| 30. *Lycæna praxiteles*, Feld. ... | c | — | — |
| 31. *argea*? ... ... ... | v.c | — | — |
| 32. *Thecla* ... ... ... | c | — | — |
| 33. *Pieris canidia*, Spar. ... | v.c | r | Generally swarms. |
| 34. *coronis*, Cram. ... ... | c | — | — |
| 35. *Catopsilia catilla*, Cram. ... | c | — | — |
| 36. *pyranthe*, Drur. ... ... | c | — | — |
| 37. *crocale*, Cram. ... ... | c | r | A few, 1893. |
| 38. *Terias hecabe*, Linn.... ... | v.c | r | A few, 1893. |
| 39. sp. .. ... ... ... | r | — | — |
| 40. *Ixias pyrene*, Linn. ... ... | c | r | One only, 1893. |
| 41. sp.... ... ... ... | r | — | — |
| 42. *Hebomoia glaucippe*, Linn. ... | c | r | One only, 1893. |
| 43. *Papilio memnon*, Linn. ... | v.c | r | One only, 1893. |
| 44. *helenus*, Linn. ... ... | v.c | r | A few, 1893. |
| 45. *polites*, Godt. ... ... | v.c | — | — |
| 46. *dissimilis*, Linn.... ... | v.c | — | — |
| 47. *antiphates*, Cram. ... | v.c | — | — |
| 48. *sarpedon*, Linn. ... ... | v.c | — | — |
| 49. *telephus*, Feld. ... ... | c | — | — |
| 50. *agamemnon*, Linn. ... | c | — | — |
| 51. *paris*, Linn. ... ... | c | r | A few, 1893. |
| 52. *bianor*, Cram. ... ... | c | r | A few, 1893. |
| 53. *Leptocircus*, sp. ... ... | c | — | — |
| 54. *Choaspes*, sp. ... ... | r | — | — |
| 55. *Baoris mathias*, Fabr. ... | r | — | — |
| 56. *Telicota bambusæ*, Moore. ... | c | — | — |
| No. of species on the wing, March 17, 1892 ... .. | 56 | | |
| No. of species on the wing, March 17, 1893 ... ... | 21 | | |

The paucity of species this year does not nearly represent the difference, for whereas butterflies swarmed at this time last year, they are very rare now. Mr. Walker and I make it a rule to go out every day and note the species, and I do not think we have missed one. It is not the lack of flowers, for the gardens are aglow, and rhododendrons are superb. I may mention that our unique *Rhodoleia Championi* flowered magnificently in February, producing two crops of flowers one after the other; the first were damaged and snapped off short at the base of the peduncle, carpeting the ground with carmine blossoms; the second blooms were not shed.

Bees are now active, cicadas and grasshoppers beginning to sing, but in diminished numbers. Hemiptera are waking up from their torpor, and coleoptera becoming numerous. I imagine there is not a great destruction of pupæ and eggs, but that they are delayed in emerging. To-day we have the first real soaking rain for months, and as the south-west monsoon has begun to make itself felt, I anticipate quite a burst of life during the next few weeks, and will report.

Another interesting phenomenon has occurred since I wrote my first account of the cold wave. The sea-water flowing from the north has cooled below the normal, and at the end of February was as low as 57° F., but has since recovered. Thousands of fish died, or floated about torpid, the critical temperature having just been reached. This state of things lasted about three days. The Chinese fishermen said the fish had cholera, and called attention to some alteration in a joss-house on an island in the harbour, any tampering with which causes sickness to man or beast, by interfering with the Fung Sui! They gave up fishing for a week, but the fish were not diseased so far as I could see.

I may note that since the Sanguir eruption in July last we have had perfect Krakatão sunsets, which are only just waning. They were in greatest force in the middle of December, and the fine after-glow was visible at the zenith an hour and a half after sunset. It was strong enough to overpower the zodiacal light. SYDNEY B. J. SKERTCHLY.

Kowloon, Hongkong, March 17.

P.S.—Mr. J. J. Walker, R.N., has just visited the Happy Valley after the rain. He finds the butterflies much more plentiful. *C. eumæus*, and *H. glaucippe* have appeared within the last two days.—March 23.

## The April Meteors.

OF the periodical meteor showers I believe that, from an observational point of view, the April Lyrids may be regarded as one of the least interesting. The display frequently disappoints expectation, and even on the night of April 20, which usually supplies the maximum, the observer often finds his patience taxed in watching a sky which gives not more than seven or eight meteors per hour from all radiants, and not more than one-third of these from the special shower of Lyrids. This is not, however, the invariable experience. Occasionally, as, for example, in 1863 and 1884, the display is a conspicuous one, and rivals other prominent showers, such as the Perseids, Orionids, and Gemmids.

This year the circumstances were not altogether favourable for observation, the crescented moon being visible on April 19 and 20 during the first half of the night, and on April 21 her setting did not take place until 14h. The sky was however clear on April 18, 20, and 21, and the period was a remarkable one on account of its exceptional heat. The maximum shade temperature on four consecutive days was registered here as follow:—April 19, 75°, April 20, 77°, April 21, 81°, April 22, 78°. The height attained on April 21 is entitled to be regarded as a rare meteorological event. With an atmosphere so salubrious the work of recording meteors was rendered very pleasant, and reminded the observer of night-watches in July and August rather than with experiences comparatively early in the spring.

On April 18 I noted 9 shooting stars in the 1½ hour between 11h. 30m. and 13h., and of these 2 or 3 were Lyrids. The shower was so meagre that it was not thought advisable to watch its progress through the night.

On April 19 the sky was not sufficiently clear for observations.

On April 20, between 11h. 15m. and 14h. 25m., I looked towards the eastern quarter of the sky and counted 18 meteors, of which 7 were Lyrids with a sharply defined radiant at 272° + 33°. Several meteors were also observed from a contemporary shower at 218° + 33° between ε and γ Boötis. I saw this shower in 1887 from the same point on April 18–25.

On April 21 the sky was beautifully clear, and I recorded 29 meteors during the 4 hours between 11h. 20m. and 15h. 25m. There were 8 Lyrids which showed very exact radiation from the point 273° + 34° and close to the position determined on the preceding night. Several of the Lyrids were fine meteors leaving bright streaks and moving with moderate speed. A minor shower was detected from slow meteors seen on this and the previous night, at 200° + 9° between Virgo and Boötes. I do not appear to have noticed this radiant during my observations of the Lyrids in former years.

On April 22 clouds unfortunately prevailed, and the further progress of the display could not be watched.

Taking my observations collectively, I saw 56 meteors in watches extending over 8½ hours on the nights of April 18, 20, and 21. Of these about 18, or one-third of the whole, belonged to the Lyrid shower. The apparent paths of the brighter meteors recorded were as follows:—

| Date 1893. | G.M.T. h. m. | Mag. | Path From α δ | Path To α δ | Probable Radiant. | Appearance. |
|---|---|---|---|---|---|---|
| April 18 | 12 50 | 1 | 254° + 22½° | 238° + 29° | 274° + 10° | Slow. B. streak. |
| ,, 20 | 11 25 | 1 | 240 + 49½ | 232 + 54 | 218 + 33 | V. slow. |
| ,, 20 | 11 56 | 1½ | 289 + 53½ | 300 + 52½ | 200 + 9 | Slow. |
| ,, 20 | 12 39 | 1 | 241 + 26½ | 231 + 23 | 272 + 33 | Not swift, streak. |
| ,, 21 | 12 8 | ♃ | 270 + 44 | 268 + 49½ | 273 + 34 | V. slow, streak. |
| ,, 21 | 12 24 | ♀ | 236 + 30 | 207 + 18 | 273 + 34 | Slow, streak. |
| ,, 21 | 13 26 | >1 | 292 + 67 | 307 + 67 | 263 + 61 | Rather swift, stk. |

The Lyrid seen on April 21 at 12h. 24m. was very brilliant, and it left a long streak between α and β coronæ and slightly above Arcturus. As the meteor traversed its course of 30 degrees it exhibited three outbursts of light, and the places where these occurred were indicated by bright knots in the streak.

One of the most important questions in connection with this cometary meteor shower is as to whether the radiant shows a displacement in its position as observed on successive nights. I wrote in NATURE for May 7, 1885, to the effect that my observations on April 18, 19, and 20 of the year mentioned proved a rapid shifting to the eastwards, and even greater than that recognised in the radiant of the July and August Perseids. My later results confirm the supposed displacement, but show that it is far less extensive than that based on the figures obtained in 1885. I append a summary of all my radiants for this shower with the exception of those obtained in the years 1873 and 1874, which were certainly not very accurate owing to my inexperience in the work at that time. In comparing the various positions included in the list, it must be remembered that too much weight should not be given to any one individually, but that the general result deducible from them all will ensure the most trustworthy conclusions. The first position in the list, viz. that for April 18, 1885, is undoubtedly too far west to be consistent with the others, while that for April 19, 1877, is equally too far north. From the distribution of the radiants in right ascension there is striking evidence of displacement. Further observations will be very valuable, especially if made at the beginning and ending of the shower on say April 16, 17, and 22 and 23. But on these nights it is scarcely visible at all, so that it will be advisable to watch for it during the whole night, and perhaps to amalgamate the results for a similar date in several years.

*Radiants of Lyrids observed at Bristol.*

| | | | |
|---|---|---|---|
| 1885 | April 18 | 260° | +33° |
| 1887 | ,, | 266 | +33 |
| 1877 | April 19 | 269 | +37 |
| 1884 | ,, | 269 | +33 |
| 1885 | ,, | 268 | +33 |
| 1887 | ,, | 269 | +31 |
| 1878 | April 20 | 273 | +32 |
| 1879 | ,, | 272 | +33 |
| 1885 | ,, | 274 | +33 |
| 1887 | ,, | 271 | +33 |
| 1893 | ,, | 272 | +33 |
| 1878 | April 21 | 272 | +32 |
| 1893 | ,, | 273 | +34 |
| 1878 | April 22 | 275 | +31 |

The consistency of the positions on April 20 sufficiently shows that the radiant is sharply defined and that its place may be determined with considerable precision.

In looking over the observations I found two trifling clerical errors in my catalogue of radiants printed in the *Monthly Notices* for May, 1890. Radiant number 102 was seen on April 19, not April 20, 1884, and number 104 on April 21, not April 20, 1878.

I believe this shower lasts from April 16 to 23. On the former date in 1877 I recorded three of its meteors, and the radiant was indicated at 263° + 33°, but not with certainty.

The very fine meteor of April 15 last, 9h. 52m., seen in many parts of the country, was not an early Lyrid, but appears to have be-